REMARKS/ARGUMENTS

Favorable reconsideration of this application, in light of the present amendments and following discussion, is respectfully requested.

Claims 5-8 and 13-20 are pending; no claims are amended or canceled; and Claims 17-20 are newly added herewith. It is respectfully submitted that no new matter is added by this amendment, as support for new claims 17-20 may be found, for example, at pages 33-34.

In the outstanding Office Action, Claims 5-7 and 13-15 were rejected under 35 U.S.C. § 102(e) as anticipated by Ide et al. (U.S. Pat. No. 6,304,292, hereafter Ide); and Claims 8 and 16 were rejected under 35 U.S.C. § 103(a) as unpatentable over Ide in view of Irie et al. (U.S. Pat. No. 5,644,409, hereafter Irie).

With regard to the rejection of Claims 5-7 and 13-15 under 35 U.S.C. § 102(e) as anticipated by Ide, that rejection is respectfully traversed.

As previously described by the Applicants, the peak value of the image signal varies due to variation in the color of the background of the original image. In many cases, the original image read by the image reading apparatus is an image printed on a paper sheet. Usually, the above-mentioned color of the background of the original image is the color of the paper sheet. The color of the paper sheet is usually white. However, when the paper sheet on which the original image is printed is not white, but is a color such as red, the peak value of the image signal varies with the color of the paper sheet. As a result, the output of the peak hold portion 4 varies, and the reference voltage of the A-D converting portion 3 varies. Consequently, the level of the black offset that must be eliminated from the original image through the black shading correction formed by the black shading correction portion 5 may vary.[1]

[1] Specification, pages 8-9.

When the signal-to-noise ratio (S/N ratio) of the image reading apparatus is poor, variation in the average of the outputs of the photoelectric sensors of the OPB portion occurs due to noise. As a result, the black reference level used for the black shading correction may vary for each line due to noise. When the black reference level varies for each line, a pattern of lateral stripes may develop in the image represented in the image signal.[2]

As described in the non-limiting description in the specification at pages 27-28, and as depicted in the non-limiting illustration of Figure 5, the analog image signal output by the CCD portion 1 undergoes signal processing by the signal processing portion 2. Then, the analog image signal is converted into a digital image signal by the A-D converting portion 3. The digital image signal output from the A-D converting portion 3 is input into the black shading correction portion 25, and undergoes black shading correction. The average calculating circuit 17 of the black shading correction portion 25 calculates the average of outputs of the OPB portion of the CCD portion 1. Then, the average calculating circuit 17 outputs the calculated average Dopb. The moving-average circuit 29, which receives the average Dopb, calculates a moving average Db,n. The moving average Db,n represents the average, in the sub-scan direction of (m + 1) averages, each of which is the average in the main scan direction, and outputs the moving average Db,n to the subtracter 18. The moving average Db,n is obtained as a result of a moving-average calculation performed using the average Dopb n-m for the (n - m)th line (mth previous line) through the average Dopb, and for the nth line (current line). The subtracter 18, which has received the moving average Db,n, subtracts the moving average Db,n from the data D0 of the image signal output from the A-D converting portion 3 when the original image is read, and outputs this obtained data to the white shading correction portion 6.

[2] Id. at page 9, line 19 - page 10, line 10.

In the moving average circuit 29, as depicted, for example, in the non-limiting illustrations of Figures 5 and 6, no feedback circuit is included, and there is no repeated summation of a current value and a once-weighted average value. M averages for a main scan line are latched in M latches in sequence. Then, the M averages for a main scan line thus latched are further averaged for the sub-scan direction by an average calculating portion 31. Accordingly, it is possible to remove the influence of previous data after M lines are processed.

To this end, Claims 5 and 7 recite "the black reference level is a moving average of the black reference values." Claims 13 and 15 recite that "the black reference level for each line is obtained for moving-averaging the black reference levels for the plurality of lines." Those features distinguish over Ide.

Ide relates to a digital video camera with high-speed mode. The Office Action states at page 5 that Ide discloses that the black reference level is a moving average of the black reference values, and cites to col. 9, lines 17-25 of Ide. However, as shown in Figure 11 of Ide, averaging is performed using current data input via a selection circuit 52 and data of a previous average fed back from an adding register 262. In this configuration, the influence of previous data is not removed, since the previous data may be accumulated in the previous average fed back from the adding register 262, even if the rate of accumulation may be reduced by a weighting coefficient K.

Generally speaking, Ide represents a weighted averaging system, rather than a moving averaging system. With a moving averaging system, unlike the weighted averaging system of Ide, it is possible to effectively reduce an influence of the most recent data. In fact, in Ide assuming that an average of data for lines 11-15 is taken according to the weighted-averaging system with a weighing coefficient A, the resulting average is $15\times A+14\times A/(1-A)+13\times A/(1-A)^2+12\times A/(1-A)^3+11\times A/(1-A)^4$. Accordingly, it can be seen that with respect to the latest

data from line 15, the influence of the four line antecedent data from line 11 is reduced by $1/(1-A)^4$. By contrast, according to a moving-averaging system, since the average is (15+14+13+12+11)/5, the influence of the data from each line is uniform. Therefore, in a system that includes large quantities of noise, the moving-averaging system according to the present invention provides great advantages.

Accordingly, as Ide does not disclose or suggest a moving-averaging system as recited in Claims 5, 7, 13, and 15, it is respectfully submitted that these claims patentably distinguish over Ide. Likewise, it is respectfully submitted that dependent Claims 6, 8, 14, and 16 patentably distinguish over Ide for the reasons above set forth with regard to independent Claims 5, 7, 13, and 15. It is therefore respectfully requested that this rejection be withdrawn.

With regard to the rejection of Claims 8 and 16 under 35 U.S.C. § 103(a) as unpatentable over Ide in view of Irie, that rejection is also traversed.

Claim 8 depends from Claim 7, and Claim 16 depends from Claim 15. As noted above, Ide fails to disclose or suggest the moving averages of Claims 7 and 15. As Irie is not relied upon to disclose the features identified as deficient within Ide, Irie is not substantively addressed herewith.

Accordingly, as neither Ide nor Irie, either alone or in combination, discloses or suggests the features of Claims 7 and 15, from which Claims 8 and 16 respectively depend, it is respectfully requested that this rejection be withdrawn.

Newly added claims 17-20 are also believed to patentably distinguish over the cited references, as they depend from allowable claims 5, 7, 13 and 15.

Consequently, in view of the foregoing discussion and present amendments, it is respectfully submitted that this application is in condition for allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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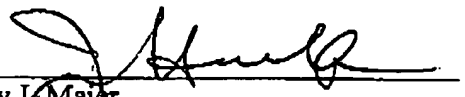

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